



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

09/966,741

10/01/2001

Kazuichiroh Itonaga

0819-0658

3606

22204

7590

03/13/2003

NIXON PEABODY, LLP
8180 GREENSBORO DRIVE
SUITE 800
MCLEAN, VA 22102

EXAMINER

QUACH, TUAN N

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 03/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n No.

09/966,741

Applicant(s)

ITONAGA, KAZUICHIROH

Examiner

Tuan Quach

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 December 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) 4-6, 10-18, 20 and 25-33 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 7-9, 19 and 21-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claims 1-3, 7-9, 19, and 21-24 are elected and will be examined. Applicant also argues that claims 4-6 and 20 dependent from claim 1 and 19 and should be examined together with claims 1-3, 7-9, 19, and 21-24. This does not correspond to the same grouping as delineated in Paper No. 9 where claims 4-6 and 20 correspond to an different process as indicated in a different embodiment, as delineated in Figs. 3A-3C and 4A-4C wherein the protection layer is required and wherein the introduction of the ions is to be effected through the protection layer; applicant has failed to address this and has not submitted evidence that the species correspond to obvious variants nor clearly admitted on the record that this is the case.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

For convenience, "et al." is omitted.

Claims 1-3, 7, 8, 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamal.

Kamal teaches forming gate 106, spacers 108/110, metal 112, first heat treatment to form silicide 122, removing unreacted metal, implanting nitrogen to the silicide, second treatment to form silicide. See Figs. 1-7, column 4 lines 10 to column 5 line 66. It would have been obvious to one skilled in the art and would have been inherent that the first silicide would be polycrystalline as it corresponds to similar metal

Art Unit: 2814

deposition and first heating for silicidation, and the implant would render the silicide amorphous, absent evidence to the contrary, and given that similar processing is employed. The provision of source/drain regions correspond to well known component regions for MOS device and as such would have been obvious.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamal as applied to claims 1-3, 7, 8, 21-23 above, and further in view of Iwamatsu.

Regarding claim 9, silicon ions correspond to well known alternative of nitrogen ions as evidenced by Iwamatsu, column 6 lines 63-65, and thus the interchange therebetween would have been obvious.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamal taken with Frankel.

Kamal is applied as above and does not explicitly recite the second treatment of less than 725°C.

Frankel teaches temperature for second annealing including temperature at 700°C. See column 6 lines 42-44.

It would have been obvious and would have been within the purview of one skilled in the art to have selected a temperature below 725 °C, since such corresponds to conventional temperature as evidenced by Frankel and since such temperature selection and optimization is well within the purview of one skilled in the art.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamal as applied to claims 21-3, 7, 8, 21-23 1-23 above, and further in view of Delfino and Koyanagi.

Art Unit: 2814

Although Kamal does not recite the preclean and nitrogen plasma, such use would have been conventional and advantageous as evidenced by Delfino, the abstract, wherein plasma treatment would serve to provide a clean surface for silicidation, and as evidenced by Koyanagi, column 11 lines 15-17, where nitrogen plasma corresponds to a well known alternative to ion implantation.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Visokay, Chen and Sekiguchi teach silicide structures for semiconductor devices.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Quach whose telephone number is 703-308-1096. The examiner can normally be reached on M - F from 9 to 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor Wael Fahmy can be reached on (703) 308-4918. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9318, (Before Final) and (703) 872-9319 (After Final).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



Tuan Quach
Primary Examiner